

## **REMARKS**

In response to the above-identified Office Action, Applicant amends the application and seeks reconsideration thereof. In this response, Applicant amends claims 3, 4, 19, 26 and 32. Applicant cancels Claims 11-13. Applicant does not add any new claims. Accordingly, claims 1-10 and 14-32 are pending.

The instant invention is directed to a lithium secondary battery exhibiting high capacity and manufactured by using a Cu-based alloy foil having both a good tensile strength and a thin thickness.

### **I. Interview Summary**

Applicant respectfully submits the following summary of a telephonic interview conducted between Examiner Tracy Dove and Applicant's attorney, Stacie J. Sundquist, on March 10, 2005. During the interview Claims 3-31 and references Ohashi WO 97/32347 and Hirai, U.S. Patent No. 5,368,958, were discussed. In particular, the Examiner's rejection of the above referenced claims under 35 U.S.C. §112 and 35 U.S.C. 102(b)/103(a) was discussed. An agreement with respect to the claims was not reached during the interview.

### **II. Amendments to the Claims**

In the attached Amendments to the Claims, Claims 3, 4, 19, 26 and 32 have been amended to recite the weight percentages already claimed after the elements to which they refer. Thus, the attached amendments are supported by the specification and do not add new matter. In view of the foregoing, Applicant respectfully requests consideration and entry of the attached Amendments to the Claims.

### **III. Claims Rejected Under 35 U.S.C. §112, first paragraph**

In the outstanding Office Action, the Examiner rejects claims 3-31 on the basis they fail to comply with the written description requirement. In particular the Examiner alleges the claims contain subject matter not described in the specification in a way to reasonably convey the inventor had possession of the claimed invention and further the specification does not enable one of skill in the art to make or use the invention. Applicant respectfully disagrees with the Examiner for at least the following reasons. The specification discloses boron and cobalt as elements that are selectable with the copper foil. See Application, page 3, lines 10-14. Moreover, the written description requirement does not require that every nuance of the claims be explicitly described in the specification. Accordingly, Applicant has met its burden of showing possession of the invention at the time of filing. Applicant further submits the specification enables a skilled artisan to make or use the invention commensurate in scope with the claims. The test for enablement is whether undue experimentation would be required to practice the invention. Since the specification sets forth both boron, cobalt and other metal alloys to be used for the alloy components, experimentation, much less undue experimentation, would not be required of the skilled artisan to specifically pick boron or cobalt for the alloy components of the copper-based alloy. In view of the foregoing, Applicant respectfully requests withdrawal of the rejection of Claims 1-31 on this basis.

### **IV. Claims Rejected Under 35 U.S.C. § 112, second paragraph**

Claims 3-32 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter

which applicant regards as the invention. The Examiner suggested during the Interview on March 10, 2005 that amending the claims to recite the specific weight percentages after each material listed may be sufficient to overcome this rejection. Thus, Applicant has amended Claims 3, 4, 19, 26 and 32 to clearly recite that the weight percent limitations for the various elements are part of the claimed invention. Accordingly, reconsideration and withdrawal of the indefiniteness rejection are requested.

**V. Claims Rejected Under 35 U.S.C. §§ 102(b)/103(a)**

Claim 32 stands rejected under 35 U.S.C. § 102(b)/103(a) as being anticipated by, and alternatively unpatentable over Ohashi et. al., WO 97/32347 ("Ohashi"). Applicant respectfully disagrees for the following reasons.

Anticipation may only be established if "each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Applicant respectfully submits, Ohashi fails to teach or suggest a lithium secondary battery comprising at least the elements of a negative current collector being formed of a copper-based alloy foil with a thickness of 20  $\mu\text{m}$  or less and the copper-based alloy including at least one material selected from the group consisting of magnesium in an amount of 0.05 to 0.6 wt% of copper, boron in an amount of 0.0005 to 5.0 wt% of copper, cobalt in an amount of 0.01 to 2.0 wt%, vanadium in an amount of 0.0005 to 0.5 wt% of copper, niobium in an amount of 0.0005 to 0.5 wt% of copper and bismuth in an amount of 0.0005 to 0.5 wt% of copper and further comprises a copper-based material selected from the group consisting of copper, copper/nickel, copper/titanium, and copper/nickel/titanium, wherein the copper-based alloy is

produced by a plating process into a foil shape, as recited in amended Claim 32. The Examiner alleges Example 1 of Ohashi teaches Applicant's claimed copper-based alloy foil with a thickness of 20  $\mu\text{m}$  or less. Applicant respectfully disagrees. Example 1 only teaches a "copper foil of 20  $\mu\text{m}$  thickness," it does not teach a copper-based alloy foil. Thus, the Examiner has not pointed to, and Applicant is unable to discern, any portion of Ohashi teaching the specific weight percentages and plating process found in Claim 32. Since Ohashi fails to teach or suggest all the elements of Claim 32, anticipation may not be found. For at least the foregoing reasons, Applicant respectfully requests withdrawal of the rejection of Claim 32 under 35 U.S.C. §102(b).

To establish a *prima facie* case of obviousness, the Examiner must show the cited references, combined, teach or suggest each of the elements of a claim. As set forth above, Ohashi fails to teach or suggest at least the elements of a negative current collector being formed of a copper-based alloy foil with a thickness of 20  $\mu\text{m}$  or less and the copper-based alloy including at least one material selected from the group consisting of magnesium in an amount of 0.05 to 0.6 wt% of copper, boron in an amount of 0.0005 to 5.0 wt% of copper, cobalt in an amount of 0.01 to 2.0 wt%, vanadium in an amount of 0.0005 to 0.5 wt% of copper, niobium in an amount of 0.0005 to 0.5 wt% of copper and bismuth in an amount of 0.0005 to 0.5 wt% of copper and further comprises a copper-based material selected from the group consisting of copper, copper/nickel, copper/titanium, and copper/nickel/titanium, wherein the copper-based alloy is produced by a plating process into a foil shape, as recited in amended Claim 32. The Examiner alleges Applicant's claimed plating process is obvious in the absence of unexpected results. Applicant respectfully directs the Examiner's attention to Table 1 of the instant application in which the test results for an

alloy prepared by adding cobalt to copper using the recited electrolytic plating process are shown. The test method was performed according to the same method found in the examples of the present invention. As seen from the results, Applicant's claimed alloy prepared by adding cobalt to copper using a plating process increases the tensile strength of the alloy and renders the composition of the alloy uniform. Applicant respectfully submits, such results are not expected from the method found in the prior art. Accordingly, Ohashi fails to teach or suggest Applicant's claimed copper-based alloy foil including the above-recited materials and plating process. Since Ohashi fails to teach or suggest all the elements of Claim 32, a *prima facie* case of obviousness may not be established. For at least the foregoing reasons, Applicant respectfully requests withdrawal of the rejection of Claim 32 under 35 U.S.C. §103(a).

#### **V I. Claims Rejected Under 35 U.S.C. § 103(a)**

Claims 4-6, 26, 27, 29, 31 and 32 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,368,958 issued to Hirai et. al. ("Hirai"). Applicant respectfully disagrees for at least the following reasons.

In regard to independent Claim 4, Applicant respectfully submits Hirai fails to teach or suggest a lithium secondary battery comprising at least the elements of negative current collector made of a copper-based alloy with a thickness of 20  $\mu\text{m}$  or less and the copper-based alloy comprises at least one material selected from the group consisting of boron in an amount of 0.0005 to 5.0 wt% of copper and cobalt in an amount of 0.01 to 2.0 wt% of copper, and also comprises at least two materials selected from the group consisting of nickel 0.8 to 4 wt% of copper, titanium in an amount of 0.2 to 4 wt% of copper, magnesium in an amount of 0.05 to 0.6 wt% of copper, tin in an

amount of 0.1 to 2.0 wt% of copper, zinc in an amount of 0.0005 to 0.5 wt% of copper, chromium in an amount of 0.0005 to 0.5 wt% of copper, manganese in an amount of 0.1 to 1.0 wt% of copper, silicon in an amount of 0.1 to 0.5 wt% of copper, iron in an amount of 0.01 to 2.0 wt%, vanadium in an amount of 0.0005 to 0.5 wt% of copper, aluminum in an amount of 0.005 to 0.5 wt% of copper, zirconium in an amount of 0.0005 to 0.5 wt% of copper, niobium in an amount of 0.0005 to 0.5 wt% of copper, phosphorous in an amount of 0.02 to 0.16 wt% of copper, bismuth in an amount of 0.0005 to 0.5 wt% of copper, lead in an amount of 0.0005 to 0.5 wt% of copper and silver in an amount of 0.0005 to 0.5 wt% of copper, wherein the copper-based alloy is produced by a plating process into a foil shape as recited in amended Claim 4. The Examiner has not pointed to, and Applicant is unable to discern, any portion of Hirai teaching a copper based alloy foil having materials with the above-recited weight percentages. Thus, Hirai fails to teach or suggest each and every element of Claim 4. Since each element of Claim 4 is not taught or suggested by Hirai, a *prima facie* case of obviousness may not be established. For at least the foregoing reasons, Applicant respectfully requests withdrawal of the rejection of Claim 4 under 35 U.S.C. §103(a).

In regard to Claims 5-6, these claims depend from independent claim 4 and incorporate the limitations thereof. Thus, at least for the reasons mentioned in regard to Claim 4, these claims are not obvious over Hirai. Accordingly, reconsideration and withdrawal of the rejection of Claims 5-6 under 35 U.S.C. § 103(a) is respectfully requested.

In regard to Claim 26, Applicant respectfully submits Hirai fails to teach or suggest a lithium secondary battery comprising at least the elements of a negative current collector is made of a copper-based alloy foil with a thickness of 20  $\mu\text{m}$  or less,

and the copper-based alloy foil includes at least one material selected from the group consisting of boron in an amount of 0.0005 to 5.0 wt% of copper and cobalt in an amount of 0.01 to 2.0 wt% of copper, and also includes at least two materials selected from the group consisting of nickel in an amount of 0.8 to 4 wt% of copper, titanium in an amount of 0.2 to 4 wt% of copper, magnesium in an amount of 0.05 to 0.6 wt% of copper, manganese in an amount of 0.1 to 1.0 wt% of copper, and zinc in an amount of 0.0005 to 0.5 wt% as recited in Claim 26. The Examiner has not pointed to, and Applicant is unable to discern, any portion of Hirai teaching a copper based alloy foil having materials with the above-recited weight percentages. Thus, Hirai fails to teach or suggest each and every element of Claim 26. Since each element of Claim 26 is not taught or suggested by Hirai, a *prima facie* case of obviousness may not be established. For at least the foregoing reasons, Applicant respectfully requests withdrawal of the rejection of Claim 26 under 35 U.S.C. §103(a).

In regard to Claims 27 and 29, these claims depends from independent claim 26 and incorporate the limitations thereof. Thus, at least for the reasons mentioned in regard to Claim 26, Claims 27 and 29 are not obvious over Hirai. Accordingly, reconsideration and withdrawal of the rejection of Claims 27 and 29 under 35 U.S.C. § 103(a) is respectfully requested.

In regard to Claim 32, Applicant respectfully submits Hirai fails to teach or suggest a lithium secondary battery comprising at least the elements of a negative current collector being formed of a copper-based alloy foil with a thickness of 20  $\mu\text{m}$  or less and the copper-based alloy including at least one material selected from the group consisting of magnesium in an amount of 0.05 to 0.6 wt% of copper, boron in an amount of 0.0005 to 5.0 wt% of copper, cobalt in an amount of 0.01 to 2.0 wt%,

vanadium in an amount of 0.0005 to 0.5 wt% of copper, niobium in an amount of 0.0005 to 0.5 wt% of copper and bismuth in an amount of 0.0005 to 0.5 wt% of copper and further comprises a copper-based material selected from the group consisting of copper, copper/nickel, copper/titanium, and copper/nickel/titanium, wherein the copper-based alloy is produced by a plating process into a foil shape as recited in Claim 32. The Examiner has not pointed to, and Applicant is unable to discern, any portion of Hirai teaching a copper based alloy foil having materials with the above-recited weight percentages. Thus, Hirai fails to teach or suggest each and every element of Claim 32. Since each element of Claim 32 is not taught or suggested by Hirai, a *prima facie* case of obviousness may not be established. For at least the foregoing reasons, Applicant respectfully requests withdrawal of the rejection of Claim 32 under 35 U.S.C. §103(a).





### CONCLUSION

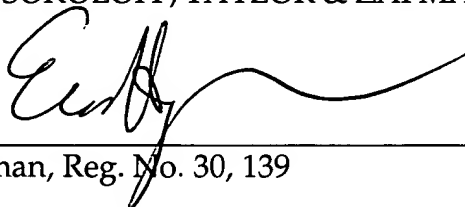
In view of the foregoing, it is believed that all claims now pending, namely claims 1-32 patentably define the subject invention over the prior art of record, and are in condition for allowance and such action is earnestly solicited at the earliest possible date. If the Examiner believes that a telephone conference would be useful in moving the application forward to allowance, the Examiner is encouraged to contact the undersigned at (310) 207-3800.

### PETITION FOR EXTENSION OF TIME

Per 37 C.F.R. 1.136(a) and in connection with the Office Action mailed on November 30, 2004, Applicant respectfully petitions the Commissioner for a two (2) month extension of time, extending the period for response April 30, 2005. The Commissioner is hereby authorized to charge payment to Deposit Account No. 02-2666 in the amount of \$450.00 to cover the petition filing fee for a 37 C.F.R. 1.17(a)(2) large entity. A duplicate copy of this sheet is enclosed.

Respectfully submitted,

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Dated: April 29, 2005

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### CERTIFICATE OF MAILING:

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on April 29, 2005.

  
Jean Svoboda